USSR Report

EARTH SCIENCES

No. 1

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. JPRS 74815	2.	3. Recipient's Accession No

4. Title and Subtitle	5. Report Date
USSR REPORT: EARTH SCIENCES, No. 1	26 December 1979
	6.

7. Author(s)	8. Performing Organization Rept. No.

9. Performing Organization Name and Address	10. Project/Task/Work Unit No.
Joint Publications Research Service	
1000 North Glebe Road	11. Contract(C) or Grant(G) No.
Arlington, Virginia 22201	(C)
	(G)

12. Sponsoring Organization Name and Address	13. Type of Report & Period Covered
As above	
	14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This report contains abstracts of formal scientific reports and news items on Soviet research in the earth sciences, including meteorology, oceanology, and geophysics. Information on current Arctic and Antarctic expeditions is also provided.

17. Document Analysis a. Descriptors

USSR
Earth Sciences
Geophysics
Meteorology
Oceanology
Arctic
Antarctic

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group   08, 04, 17-F, I, J

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited Availability	UNCLASSIFIED	28
Sold by NTIS	20. Security Class (This Page)	22. Price
Springfield, Virginia 22161	UNCLASSIFIED	

(See ANSI–Z39.18)

OPTIONAL FORM 272 (4–77)
(Formerly NTIS–35)
Department of Commerce

USSR REPORT

EARTH SCIENCES

No. 1

CONTENTS	PAGE

[III - USSR - 21K S&T]

CONTENTS (Continued)   Page

I. METEOROLOGY

News

SOVIET-AMERICAN SYMPOSIUM ON CLIMATE MODELING

Tbilisi ZARYA VOSTOKA in Russian 14 Oct 79 p 4

[Article by A. Kikodze]

[Abstract] A Soviet-American symposium on climate modeling, climatic changes and statistical processing of climatic data began on 15 October 1979 in Tbilisi at the Caucasus Hydrometeorological Scientific Research Institute. The symposium is taking place within the framework of an agreement between the USSR and the United States in the field of environmental protection. A Corresponding Member USSR Academy of Sciences is chairing the organizational committee. Georgian scientists are presenting a paper entitled "The Character of Climatic Fluctuations in Transcaucasia." Further discussion of a joint program to study "The Effect of Environmental Changes on Climate" will follow the symposium.
[53]

PETROSYANETS CITES PROBLEMS IN LONG-RANGE WEATHER FORECASTING

Moscow VECHERNYAYA MOSKVA in Russian 28 Sep 79 p 4

[Article by M. A. Petrosyanets, Director of the USSR Hydrometeorological Center]

[Editorial Report] In response to a reader's question, Petrosyanets observes that although two-day and three-day weather forecasts are now approximately 86% accurate, predictions for a month in advance are proving to be correct only seven or eight months out of the year. Calling the refinement of long-range weather forecasting "one of the most difficult problems" faced by modern science, he notes that it can be achieved only through further developments in theory and climate modeling and the improvement of the global monitoring network, which is at present not extensive enough to meet research demands.
[54]

STATE PRIZE NOMINATION FOR LIDAR R&D

Moscow IZVESTIYA in Russian 3 Oct 79 p 3

[Article by L. Brekhovskikh, Academician USSR Academy of Sciences: "New Profession for the Laser"]

[Excerpts] On the basis of theoretical and experimental investigations carried out in the institutes of the USSR Academy of Sciences and the USSR State Committee on Hydrometeorology and Environmental Monitoring, a unique complex of laser apparatus has been created and has undergone successful testing. These are lidars, ensuring solution of a number of important problems in the national economy. The industrial introduction of the developed apparatus has taken place.

The permanently operating stations for laser sounding of the atmosphere in the cities of Dolgoprudnyy and Tomsk ensure the collection of regular information on the optical state of the atmosphere at different altitudes. There are regular flights of research aircraft with laser apparatus over virtually the entire territory of the Soviet Union, as a result of which material has been obtained which is of great geophysical importance.

Beginning since 1971 lidars have been repeatedly employed for solving a number of specific problems relating to the monitoring of aerosol effluent of industrial enterprises for the purpose of ascertaining the maximum admissible quantities, ascertaining the aerosol concentration in open pits, remote detection of the centers of forest fires, etc.

The results of these studies have created a basis for further improvement of the national system for observing and monitoring the environment.

The legitimate recognition of the timeliness of this work was the reason for proposing the cycle of studies "Development of the Physical Principles and Methods for Laser Sounding of Aerosol in the Atmosphere" for the USSR State Prize for 1979. The group of authors of this cycle of investigations, carried out under the direction of Corresponding Member USSR Academy of Sciences V. Zuyev, unconditionally merits this award.
[52-5303]

DATA PROCESSING FACILITIES FOR USSR HYDROMET SERVICE

Kishinev SOVETSKAYA MOLDAVIYA in Russian 11 Sep 79 p 4

[Article by V. Vasil'yev: "Automatic Apparatus Tracks the Weather"]

[Text] The collection of meteorological information is a complex and time-consuming process. Accordingly, highly complex radioelectronic, radiotechnical and laser instruments are appearing more and more frequently in the

role of weather predictors. A new specialized exhibition "Automated Technical Means for Observation, Collection, Processing and Dissemination of Data on State of the Environment," which has opened in the pavilion "USSR Hydrometeorological Service," is acquainting visitors with their most interesting models.

Whereas earlier the collection of meteorological information involved great difficulties (each day the meteorologist had to take readings from dozens of instruments), today such work is done easily by automatic equipment. One such apparatus is the ASMT-1 aggregate complex of hydrometeorological equipment (agregatnyy kompleks sredstv gidrometeorologicheskoy tekhniki).

The complex includes different sensors and at the same time can measure air temperature and humidity, wind velocity and direction, atmospheric pressure and many other parameters. Suffice it to mention that the complex replaces 30 meteorological instruments. Its universality in a short time will make it possible to re-outfit up to 4,000 meteorological stations of different types in our country.

In the technical outfitting of the State System for Observing and Monitoring the Natural Environment and Climate a special place is occupied by meteorological radars. Using these radars it is possible to determine the position of clouds, thunderstorms, hail, showers and squalls. The use of a radar storm warning network has increased the reliability of information on dangerous weather phenomena and will give a considerable economic effect. The network of meteorological radars in the country is extremely extensive. They are installed at airports, at zonal hydrometeorological observatories and in regions protected against hail falls.

The "Osadki" (Precipitation) and "Turbulentnost'" (Turbulence) attachments have been developed and are undergoing the last tests as additional devices for standard-produced radars. The "Osadki" apparatus ensures routine automatic measurement and registry of liquid precipitation within a radius of as much as 100 km. Such data are of great importance for agriculture. The "Turbulentnost'" complex makes it possible to obtain important information on the spatial structure of the wind field, which is necessary in order to ensure the safety of aircraft flights.

The processes transpiring in the upper layers of the earth's atmosphere are of great scientific and practical interest. Physical processes at altitudes of 80-180 km are being studied using research rockets. There are now about 50 stations from which meteorological rockets are launched.

The exhibition tells in detail about the MR-12 rocket complex, which helps in study not only of atmospheric processes associated with weather formation, but also other geophysical phenomena in the upper layers of the atmosphere. An automatic station, placed in the rocket nosecone, measures and transmits to earth the data obtained in flight. The rocket engine operates on solid fuel, which allows its prolonged storage and its delivery by any

types of transportation.

Thousands of meteorological stations in our country are making observations of meteorological conditions over enormous areas. In addition, meteorological information is received from satellites and it is transmitted to foreign meteorological centers.

How is it possible to bring it all together routinely, to process it so that it will not lose its value? This problem is being solved by specialists at the Computation Center USSR Hydrometeorological Center, whose work is described at the exhibition.

The Center is outfitted with powerful electronic computers. Among these is the BESM-6 electronic computer with a speed of 1 million operations per second and the YeS-1040 electronic computer with a speed of 300,000 operations per second. All the electronic computers are combined into a unified system by direct automated communication lines. This makes it possible to ensure the collection and accumulation of meteorological data with a volume up to 10 million digits.

The processed data, that is, the already finalized weather forecast, must be routinely transmitted to the user. Attached to the electronic computers are drafting apparatuses of the "Digigraf" type which each day are used in the drafting of 150 prognostic charts. They are transmitted through facsimile channels or in coded form directly to the "Pogoda" (Weather) system, which then transmits them to all interested ministries and departments.

The exhibition also reflects the work of Soviet meteorologists in the field of preservation of the environment. On exhibit are different instruments, gas analyzers and automatic stations for monitoring the purity of the air and water. Many will be interested, for example, in a mobile laser apparatus designed for study of extensive sectors of the atmosphere for the purpose of safeguarding parks, forests and residential areas against contamination.
[51-5303]

Abstracts of Scientific Articles

CONVECTION INDUCED BY THERMAL EFFECT OF VERTICAL LASER BEAM

[Article by P. N. Svirkunov, Institute of Experimental Meteorology, "Convection Induced by the Thermal Effect of a Vertical Laser Beam on the Cloud Medium"]

[Abstract] In investigations of the propagation of strong laser beams in cloud media and the creation of clearings in them an important aspect is study of convective movements of the medium induced by the laser radiation. Accordingly, the author studied the convection induced by the effect of a vertical beam of CO_2 laser radiation on the cloud medium, with the problem being formulated as follows. Assume that a cylindrical beam of laser radiation with the radius R and the intensity I_0 is vertically incident on the boundary of a homogeneous motionless cloud medium occupying the half-space $z > 0$. The evaporation of the cloud medium under the influence of the radiation leads to the formation of a cleared zone whose transverse dimensions are close to the dimensions of the beam and the front moves along the beam with the velocity ufront $\sim I_0/LW_0$, where W_0 is the initial liquid-water content, L is the specific heat of evaporation of the water. For typical cloud conditions $W_0 \sim 0.5$ g/m^3 and the intensity is $I_0 \sim 10^3$ W/cm^2 and the u_{front} value will be about 10 km/sec, so that it can be assumed that movement of the clearing front occurs virtually instantaneously in comparison with the characteristic velocities of movement of the medium. Since the process of evaporation of droplets under the influence of radiation is accompanied by the release of heat into the medium, the cleared zone formed after passage of the front will be heated relative to the surrounding medium. This causes ascending convective movements and the rate of convection will increase with altitude, as a result of which there will be entrainment of the surrounding cloud medium into the region of the beam and the evaporation of droplets will be subjected to the heat release process and accordingly convection. An asymptotic expression is derived for the stationary velocity field at distances from entry of the beam into the medium much greater than the beam diameter. The dependence of the mean convection rate along the beam on time is investigated. References 13: 11 Russian, 2 Western.
[24-5303]

EFFECTS FROM HEATING OF TROPOSPHERE BY ELECTROMAGNETIC RADIATION

[Article by V. P. Dokuchayev and Corresponding Member USSR Academy of Sciences V. S. Troitskiy, Gor'kiy Scientific Research Radiophysics Institute, "Meteorological and Acoustic Effects from Artificial Heating of the Troposphere by Electromagnetic Radiation"]

[Abstract] Electromagnetic radiation in the optical and especially in the radio range can be used in heating the troposphere. This radiation is appreciably absorbed by the atmosphere. It is resonance radiation with well-expressed strong absorption bands separated by windows of transparency. The advances in high-power electronics with respect to the generation of superhigh-frequency waves afford an effective method for artificial heating of the troposphere considerably superior to methods employed earlier. Radio waves in the millimeter range, especially near the absorption line of oxygen at a wavelength of 5 mm, make it possible to heat the troposphere in the volume of the projector zone of the antenna. The base area of the vertical air column depends on the number and apertures of the antennas and its length by the choice of frequency; it can vary in the range from a hundred meters to several kilometers. Any configuration of heated volume can be created. The temperature gradients in the heated region generate convective movements of air masses, that is, exert an effect on meteorological processes in the atmosphere. An important quality of volumetric electromagnetic heating is its low inertia, that is, the possibility for rapid changes of the absorbed power by amplitude and frequency modulation of superhigh-frequency oscillations. This affords possibilities for creating a new radiation source for exciting sonic, infrasonic and internal waves. The absorption of electromagnetic waves is accompanied by the instantaneous release of heat, which leads to heating of the atmosphere and expansion of the heated region. The forming pressure gradients give sonic effects. Electromagnetic heating will make possible effective solution of other problems, such as dissipation of fogs. This article examines in detail the meteorological and acoustic phenomena accompanying the absorption of electromagnetic radiation in continuous and amplitude-modulated generation regimes. References 9: 8 Russian, 1 Western. [55-5303]

II. OCEANOGRAPHY

Abstracts of Scientific Articles

TWO-PARAMETER MODEL OF STATIONARY THERMOCLINE

[Article bv A. V. Frolov, USSR Hydrometeorological Center, "Two-Parameter
Model of the Stationary Thermocline in the Ocean"]

[Abstract] A study was made of the problem of the stationary structure and
circulation of waters in a rectangular basin outside the boundary layers.
The motion of the fluid is caused by inhomogeneity of the temperature field
at the surface and the wind effect. The structure of the thermocline is de-
scribed by a density model, whose unknown parameters are determined from
the problem itself. An analysis of the solution obtained shows that for
the conditions of the subtropical circulation in the North Atlantic it
gives two qualitatively different types of density profiles (with and with-
out an "inflection" point). At the same time there is an appreciable re-
finement of the quantitative characteristics of the vertical distribution of
density and currents, obtained using n exponential single-parameter model.
Figures 4, 1 table; references 12: 6 Russian, 6 Western.
[18-5303]

SPECTRA OF TEMPERATURE FLUCTUATIONS IN WIND WAVES LAYER

[Article by G. N. Khristoforov and A. S. Zapevalov, Marine Hydrophysical
Institute, Ukrainian Academy of Sciences, "Parameterization of Spectra of
Short-Period Temperature Fluctuations Measured in the Wind Waves Layer"]

[Abstract] The authors examine the characteristic frequency scales of the
surface rise $\eta(t)$ and temperature fluctuations $T(t)$ in the upper layer
of the sea and also the correlation between them. It is shown that a

linear interaction between η and T occurs in a narrow frequency band near the central frequency of the surface rise spectrum. The parameterization of the spectra of "wave" $S_T^w(f)$ and "incoherent" $S_T^i(f)$ components of temperature fluctuations is proposed. It is shown that the correlation between $S_T^w(f)$ and $S_T^i(f)$ is determined by the following quadratic integral parameters: Cox number C^2, microstructure scale number D^2 and turbulence scale number M_T^2. Figures 2; references 12: 7 Russian, 5 Western.
[18-5303]

USE OF TOWED MAGNETOMETER FOR STUDYING MAGNETIC FIELD

[Article by A. A. Shreyder, G. M. Valyashko, B. S. Perunov and E. A. Prokhorenko, Institute of Oceanology, "Experience in Use of the KM-3 Towed Component Magnetometer for Studying the Magnetic Field in the Ocean"]

[Abstract] Experimental work with the KM-3 quantum towed component magnetometer was initiated on the 20th voyage of the "Akademik Kurchatov" in the Atlantic Ocean and on the 58th voyage of the "Vityaz'" in the Indian Ocean it was used for the first time in combination with the "Meridian" special processor. The KM-3 magnetometer - "Meridian" special processor were used in making magnetic measurements along profiles with a total length of about 9,000 miles. The KM-3 makes it possible to measure the modulus of the total vector of strength of the earth's field and also determine the vertical (Z) and horizontal (H) components by the three moduli, manual compensation and autocompensation methods. The determinations of the H- and Z-components are made by the three moduli method on the basis of three successive measurements of the field total vector modulus and the full values of the total vector with additional fields created in the vertical direction by a special system of current rings and a Cardan joint. It was possible to determine the real scatter of the measured T, Z, H and I values and the survey error was estimated at the intersections of the runs. It was found that the presence of a special processor not only made it possible to use the autocompensation method with the KM-3, but also, considerably more easily, to carry out a routine analysis of the results and monitor the measurements because synchronously with the survey process there was visual display of the T, Z, H values in each measurement cycle. The system has a high performance level under real sea conditions. Figures 3; references: 2 Russian.
[16-5303]

CONTRASTS OF PETROLEUM FILMS ON SEA

[Article by I. Ya. Gurevich, A. M. Kokorin and K. S. Shifrin, Leningrad
Division of the State Oceanographic Institute and Leningrad Division of
the Institute of Oceanology, "Radiometric and Visual Contrasts of Petrol-
eum Films on the Sea"]

[Abstract] An investigation was made of the influence of the spectral re-
sponse curves for radiation 'etectors on the brightness contrast between
a petroleum film and pure sea water and an estimate was made of the dis-
creteness of determination of the thickness of films on the basis of the
contrast change. Two specific radiation detectors are considered: a) the
MIR-3 radiometer; b) the eye. The scheme proposed in this article can be
applied to any method for detection and evaluation of the thickness of pet-
roleum films on the sea. The reception system must be stipulated by the
spectral response curve and the energy threshold. Thus, it is shown that
by having data on the reflection coefficients $R(\lambda, \hat{L})$, that is, data
for idealized monochromatic detectors, it is possible to evaluate the pos-
sibilities of real detectors with a given spectral response curve $\theta(\lambda)$
and the system threshold ξ. The two typical cases examined are: 1) a
system operating on the radiometric principle, that is, distinguishing
the object from the background on the basis of its thermal radiation; 2)
a system operating in reflected light. The findings in this paper can be
applied directly to any thermal detectors in both the IR and microwave
ranges, as well as to photo- and television systems, both black-and-white
and spectrozonal. In all cases the general approach presented here makes
it possible to evaluate the possibilities of detection of the thickness
of petroleum films if $R(\lambda, \hat{L})$ is known, as well as the spectral response
curve and the system energy threshold. Figures 3; references 3 Russian.
[16-5303]

STRUCTURE AND DYNAMICS OF A SYNOPTIC EDDY

[Article by Academician Ukrainian Academy of Sciences B. A. Nelepo and A. N.
Paramonov, Marine Hydrophysical Institute Ukrainian Academy of Sciences,
"Hydrogeological Structure and Characteristics of Dynamics of a Synoptic
Eddy"]

[Abstract] A joint expedition of two research ships of the Marine Hydrophys-
ical Institute ("Akademik Vernadskiy" and "Mikhail Lomonosov") in the region
of the POLIMODE experiment discovered and investigated a cyclonic eddy whose
hydrological structure differed considerably from the characteristics of the
Gulf Stream rings and eddies in the open ocean. From the time of discovery

to the completion of the investigations (10 December 1977-21 February 1978)
the eddy moved a distance of about 230 miles from the southern boundary of
the POLIMODE polygon with coordinates of the center 26°30'N, 70°15'W to its
northwestern boundary with the coordinates 29°53'N, 71°41'W. Figure 1 in
the text is a map of depths of the 15°C isotherm, constructed using the re-
sults of nine hydrological surveys. The map shows the successive positions
of the center of the eddy and an inset shows a curve of the velocity of its
movement. During the initial period the eddy moved in a northerly direction
and its center experienced zonal oscillations with an amplitude 10-15 miles.
These oscillations were accompanied by variations of eddy velocity in the
range 2.2-3.5 miles per day. The eddy sharply changed its velocity of move-
ment and by late February 1978 it attained 8.2 miles per day. Analysis of
data from three large-scale surveys of the entire polygon, measuring 300 x
300 miles, indicated that the trajectory of movement of the eddy in general
corresponded to the position of the frontal zone and the 15° isotherm run-
ning at a depth of 600 m. The trajectory of the center of the eddy adhered
closely to the position of the isobaths of the Blake Plateau, evidently re-
flecting the interrelationship between dynamic processes at intermediate
depths and bottom relief of the investigated part of the Sargasso Sea. It
is concluded that the eddy did not belong to the family of Gulf Stream
rings, but was formed in the southeastern North Atlantic. Figures 3; ref-
erences 4: 3 Russian, 1 Western.
[32-5303]

INSTABILITY OF DISCONTINUITY OF FLOWS

[Article by S. V. Nesterov and S. Ya. Sekerzh-Zen'kovich, Moscow Power Inst-
itute and Institute of Problems of Mechanics, "Instability of Discontinuity
of Flows With Fluctuations of Their Relative Velocity"]

[Abstract] The stability of the discontinuity between two layers of fluid of
different densities, which move relative to one another with a relative vel-
ocity subject to random changes with time was investigated. The hydrodynamic
problem was formulated as follows. Assume that there are two layers of an
ideal incompressible fluid, situated one above the other, the upper of which
has the density ρ_1, and the lower $\rho_2 > \rho_1$. Both layers extend infinitely
in horizontal directions and their depth is also infinite. The particles of
both layers of fluid are acted upon by gravity directed vertically downward
and also by surface tension forces. It is also assumed that mass forces act
upon the particles of the layers of fluids in the direction along the sur-
face of the discontinuity. It is assumed that the magnitudes of these forces
are not dependent on coordinates but change with time. In this formulation
it is demonstrated that in the diffusion random process approximation the

10

discontinuity is unstable with respect to second moments. It follows, for example, that with the mean value of the square of relative velocity of flows of fluids less than the critical value obtained from the classical Kelvin theory there will always be an exponential increase in the energy density of waves due to fluctuations of relative velocity. References 4 (Russian).
[24-5303]

NONLINEAR ATTENUATION OF LONG SURFACE WAVES IN STRATIFIED OCEAN

[Article by V. V. Petrov, Gor'kiy State University, "Nonlinear Attenuation of Long Surface Waves in a Stratified Ocean"]

[Abstract] In the ocean long waves can effectively interact with waves of other types, for example, with internal waves. If in this process the internal waves form a subsystem of random waves, the process of energy transfer from a coherent surface wave to internal waves becomes irreversible and leads to its relaxation. In this article such interaction is examined in the random phases approximation for the case of a two-layer model of the ocean. Examples are cited of the distribution of random internal waves in which it is shown that isotropic and anisotropic spectra correspond to an identical attenuation of surface gravitational waves. The degree of attenuation of long surface waves due to their interaction with random internal waves can attain the maximum values for the theory of slightly nonlinear interaction. A surface wave will attenuate by a factor of e with coverage of the distance $\sim 10^3$ km from the moment of beginning of its interaction with internal waves. References 4 (Russian).
[24-5303]

INVESTIGATION OF STOKES RADIATION OF SEA WATER

[Article by V. V. Polovinko, Moscow Institute of Geodetic, Aerial Mapping and Cartographic Engineers, "Investigation of Stokes Radiation of Sea Water"]

[Abstract] Marine research requires investigations of the biological structure and dissemination of contaminants in the world ocean with an adequately high spatial-temporal resolution, which can be ensured by the use of new noncontact methods for the chemical-biological monitoring of sea water.

The author here examines the possibility of creating such methods using the phenomena arising during the interaction of electromagnetic radiation in the optical range with biological objects and the chemical substances present in sea water. The point of departure is the noncontact laser sounding of sea water with use of the spectral analysis of Stokes radiation. In this method sea water is sounded by pulses of laser radiation with a small angular divergence, the brightness of Stokes radiation of sea water caused by combination scatteri:g and photoluminescence is measured, the spectral components of radiation are measured, and these are used in determining the hydrobiological and hydrochemical characteristics. The author fully explores the dependence of the radiation brightness of sea water on the characteristics of sea water. Equations are derived for the noncontact laser sounding of sea water for two measurement schemes. These can be used as a basis for solving problems in the chemical-biological monitoring of sea water. Figures 2; references 5 (Russian).
[21-5303]

III. TERRESTRIAL GEOPHYSICS

News

EARTHQUAKE-PREDICTION DEVICE ON DISPLAY

Tashkent PRAVDA VOSTOKA in Russian 11 Oct 79 p 4

[Abstract] A new geophysical unit is on display as part of a special exhibit on the "Peaceful Atom in Socialist Countries" at the USSR Exhibition of National Economic Achievements (VDNKh). The "Pamir-1" unit was designed at the Institute of Atomic Energy imeni Kurchatov in an effort to achieve greater accuracy in forecasting earthquakes. Hailed as the first of its kind in the world, it detects the change in apparent resistivity of rock which begins approximately six weeks before an earthquake occurs. In this way, both location and magnitude of earthquakes can be predicted.
[50]

Abstracts of Scientific Articles

TOPOISOSTATIC REDUCTION OF SEA PROFILE GRAVIMETRIC OBSERVATIONS

[Article by V. A. Kucherinenko, Institute of Physics of the Earth, "Topo-
isostatic Reduction of Sea Profile Gravimetric Observations"]

[Abstract] The author examines the problems involved in choosing gravity
reductions in the interpretation of sea gravimetric observations. It is
shown that for a comparative study of oceanic structures the total Bouguer
anomaly in many cases is inapplicable and it is necessary to take into ac-
count the influence of topographic and compensatory masses of the entire
surface of the earth and also undulations of the surface of the geoid
(Glenn, Bruns and Zhongolovich corrections). The article gives an algo-
rithm and program for computing topographic and isostatic corrections for
gravity values measured along arbitrarily arranged runs. The proposed
method is based on the automatic reduction of bathymetric charts to dig-
ital form. This makes it possible, in comparison with existing methods
for taking the influence of relief into account, to reduce by a factor
of ten the expenditures of manual labor on the preparation of computer
calculations and gives a real possibility for calculating the pertinent
anomalies. The method makes it possible to take into account the influ-
ence of distant zones, poorly consolidated sediments and also deviations
of the geoid from the ellipsoid of relativity, that is, obtain fully valid
"pure" Glenn and isostatic anomalies. Figures 4, tables 1; references 23:
17 Russian, 6 Western.
[22]

RADIATION OF LONGITUDINAL WAVES FROM FOCUS OF TECTONIC EARTHQUAKE

[Article by Ye. E. Blagoveshchenskaya, Institute of Seismic Resistant Construction and Seismology, Academy of Sciences Tadzhik SSR, "Direction of Radiation of Longitudinal Waves from the Focus of a Tectonic Earthquake"]

[Abstract] An analysis of the amplitude spectra of longitudinal waves for 100 records of crustal earthquakes has shown that radiation from the focus is not spherically symmetric. It is associated with the orientation of the focal mechanism and correlates well with the smoothed theoretical radiation function, computed for a point quadrupole source. The smoothing parameter with which the best correlation is observed is dependent on the duration of the sector of the seismogram for which the spectrum is computed. The article gives the observed function for radiation from the focus of a tectonic earthquake of the energy class $K = 9$ in the plane normal to the intermediate axis of the focal mechanism. The radiation in the direction of the compression axis was appreciably less than in the direction of the dilatation axis. Figures 7; references 8 (Russian).
[20]

DEEP STRUCTURE OF SOUTHERN MARGIN OF CASPIAN DEPRESSION

[Article by R. B. Sapozhnikov, Turlanskaya Geophysical Expedition, "Deep Structure of the Southern Margin of the Caspian Depression"]

[Abstract] The article examines the peculiarities of the fields of refracted waves and gives their geological interpretation. On the basis of a complex of geological-geophysical data, in the basement structure of the southern part of the Caspian depression it is possible to discriminate the North Caspian "scarp," characterized by the presence of a "granite" layer in the upper part of the earth's crust, the Sarpinskiy and Caspian-South Emba downwarps, developed on the "basalt" basement. The latter are considered as dilatation structures in the earth's crust. Along the southern margin of the Caspian depression it is possible to discriminate the Astrakhansko-Karatonskaya zone of development of shelf calcareous rocks, for the most part of Carboniferous age, underlain by Lower-Middle Paleozoic terrigenous deposits. Within the limits of the Northern Caspian scarp there are no calcareous rocks and the Paleozoic, for the most part terrigenous rocks, have a reduced thickness. The findings are important due to the importance of the region for petroleum and gas prospecting. Figures 3; references 14 (Russian).
[23]

METHOD FOR STUDYING STRUCTURE OF FOCAL RADIATION OF STRONG EARTHQUAKE

[Article by Yu. F. Kopnichev, Institute of Physics of the Earth, "Method
and Results of Investigation of Structure of Focal Radiation of a Strong
Earthquake Using the Envelopes of P-Waves"]

[Abstract] A model of formation of a high-frequency train of P-waves of a
strong earthquake is proposed, with scattering taken into account. It is
shown that the relative level of the coda is a measure of duration of the
focal momentum. The author explains some experimental data relating to
magnitude calibration using the coda. The model is used to study the
structure of radiation of teleseismic earthquakes with $M > 5.5$ from dif-
ferent regions. The typical characteristics of the impulses forming the
total signal are determined. It is shown that for a sufficiently strong
earthquake at a frequency of 0.7 Hz the energy of the scattered component
is considerably higher than the energy of the regular component. It was
possible to determine the law of change in the spectral density of energy
of strong crustal earthquakes at frequencies 0.7-2.7 Hz. The method and
results can be used in formulating a model of strong motion. Figures 6,
tables 1; references 25; 18 Russian, 7 Western.
[22]

BEHAVIOR OF INTENSITY OF SEISMIC WAVE FRONTS IN ISOTROPIC ELASTIC MEDIUM

[Article by M. A. Grinfel'd, Institute of Physics of the Earth, "Intensif-
ication and Attenuation of the Intensity of Seismic Wave Fronts in an Iso-
tropic Nonlinearly Elastic Medium"]

[Abstract] A theoretical study is made of the behavior of weak discontinuity
fronts of the acceleration wave type propagating into an undeformed region
of an isotropic elastic medium. It is shown that the kinematics of such
waves is adequately described by the equations of the classical (isotropic
linearized) theory of elasticity, since the laws of change in the intensity
of acceleration waves indicated by the nonlinear and linearized theories
are qualitatively different. According to the more precise nonlinear elas-
ticity theory, the important point in the linear theory that there is a co-
incidence of the laws of change in the intensity of discontinuities in long-
itudinal and transverse waves is violated. An investigation of weak discon-
tinuities shows that sufficiently prolonged processes of propagation of
disturbances must be studied within the framework of the nonlinear theory
even when there are very small deformations. An evaluation of the corres-
ponding time and acceleration scales is given. Figures 5; references 17:
12 Russian, 5 Western.
[22]

SHORT-PERIOD ELASTIC DEFORMATIONS OF SURFACE PARTS OF CRUST

[Article by T. V. Guseva, V. K. Kuchay, A. K. Pevnev and V. V. Chudnovskiy,
Geology Institute, Tadzhik Academy of Sciences, and Institute of Physics of
the Earth, "Short-Period Elastic Deformations of Surface Parts of the Earth's
Crust According to Data from Geodetic Measurements"]

[Abstract] During the time of pulsed-light rangefinder measurements during
the period 8-9 July 1978 in one of the geodetic nets in the Garm Geodynamic
Polygon the authors discovered short-period reversible changes in length of
the line of about 60 mm over a period of 30 minutes. An analysis of the pos-
sible reasons for changes in the readings of the pulsed-light rangefinder
leads to the conclusion that the instrument registered short-period elastic
deformations of the surface parts of the earth's crust which could be caused
by a change in rock stresses on the order of about 10 bar. The results give
basis for assuming that the most adequate rheological model of the surface
parts of the crust is a Maxwell body, which reacts elastically to short-term
loads and viscously to long-term loads. The detection of these short-period
crustal deformations make it possible to assume that the use of continuous
pulsed-light rangefinder measurements for the purpose of predicting earth-
quakes is promising. Figures 2; references 4 (Russian).
[22-5303]

PRECURSORS AND PREDICTION OF KURILE EARTHQUAKES

[Article by F. I. Monakhov, L. I. Vozhkova, A. M. Khantayev, Ye. V. Khaydur-
ova and Yu. A. Shlyuyev, Sakhalin Multidiscipline Scientific Research Inst-
itute, "Short-Range Precursors and Prediction of Kurile Earthquakes of 22-
28 March 1978"]

[Abstract] During the period 22-28 March 1978 there was a series of strong
earthquakes to the southeast of the Kurile island Iturup at a distance of
180-200 km from it. The data for the strongest earthquakes of this series
are presented in a table. This series of earthquakes was preceded by ob-
servations of precursors on the islands Kunashir, Shikotan and Iturup. On
Kunashir there were continuous observations of water level fluctuations in
three boreholes. On Shikotan there was continuous registry of the slope
and deformation of the earth's surface by tiltmeters and quartz deformographs
installed in a drift. On Iturup there were measurements of the water flow
from a yielding borehole drilled to a depth of 400 m. The distances from

the epicental zone to Shikotan and Kunashir Islands were about 220 and 270
km. The water fluctuations in the boreholes on Kunashir Island were similar.
The maximum error in measuring level did not exceed 2 cm. Experience from
earlier observations had indicated that a level drop by more than 3 cm over
a period of 2-5 days always precedes an earthquake of a definite class. In
this case during the period 15-19 March the level dropped by approximately
7 cm. Such a level change was regarded as a hydrogeodynamic precursor of
impending earthquakes. Simultaneously with the drop in water level in the
Kunashirskiye boreholes there was a marked increase in compressional defor-
mations on Shikotan in a N-S direction perpendicular to the direction to
the region of epicenters. The tilts of the earth's surface were probably
also anomalous. Thus, for seven days before the earthquake a marked change in
in tilt in direction and magnitude began. The tilt occurred for the most
part from east to west from the direction of the epicentral region and at-
tained values 0".1. The water yield in the borehole on Iturup was measured
twice a day with an accuracy to 2%. During the five days prior to the con-
sidered series of strong earthquakes it increased by 15% and after a day
fell by the same value. This sharp change was probably a reaction to earth-
quake preparation. Thus, 7-9 days prior to the March series of earthquakes
anomalous effects were registered at distances of 180-270 km from the epi-
centers and these can be regarded as short-range earthquake precursors. The
genera' conclusion is drawn that the duration of all short-term precursors,
with rare exceptions, does not exceed 10 days. Figures 1, tables 1; refer-
ences 2 (Russian).
[22-5303]

SOLUTION OF ONE REMOTE PROBLEM IN ACOUSTICS

[Article by A. G. Kleshchev and A. M. Lisin, Computation Center, Siberian
Division USSR Academy of Sciences, "Solution of One Remote Problem in Acous-
tics"]

[Abstract] A study was made of the problem of determining a convex scattering
surface on the basis of the intensity of the acoustic field reradiated by
this surface. The investigated case is when the intensity is successively meas-
ured at the points on a straight line and the case of an unknown reflection
coefficient. The problem is formulated as follows. At a point q in the acous-
tic region $\Omega \subset R^3$ with the discontinuity $S=\partial\Omega$ and the constant speed of sound
c there is a directed source of spherical acoustic waves of a high frequency
which radiates during the course of the time T. The solution is sought in
the approximation of the ray theory, whose equations are derived from the Helm-
holtz equation $\Delta u + k^2 u = 0$ by expansion of the solution into a series of in-
verse powers of frequency and with the first two terms of the expansion taken
into account. References 3 (Russian).
[32-5303]

STRUCTURE OF SUBSALT DEPOSITS IN CASPIAN SYNECLISE

[Article by A. V. Yegorkin, N. M. Chernyshev, V. N. Belokopytov, E. G. Dan-ilova and V. F. Kolomiyets, Central Scientific-Production Combine "Soyuz-geofizika," "Structure of the Subsalt Deposits of the Caspian Syneclise Ac-cording to the Results of Regional Seismic Investigations"]

[Abstract] This article gives the results of interpretation of data obtain-ed during deep seismic soundings along regional profiles Elista-Buzuluk, Saratov-Gur'yev and Buzuluk-Kushmurun, making use of a new observation method.
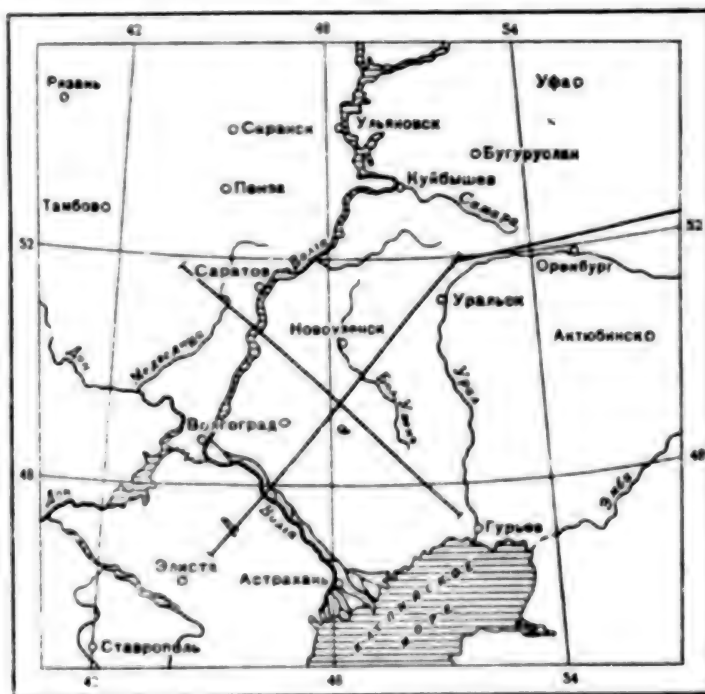
Map of layout of profiles.

This paper is confined to a discussion of the seismogeological section along the profile Elista-Buzuluk (a large fold-out shows this section in detail). The investigations were made using powerful sources of elastic oscillations and low-frequency recording apparatus. In the observations use was made of point registry of three components of soil oscillation: vertical and two horizontal. The distance between the seismic stations was 8-10 km and the distance between shot points was 150 km. Shots were set off each 500 km, ensuring a high intensity of waves of different types (longitudinal, trans-verse, exchange) at considerable distances. The authors give a geological

interpretation of the seismic data and a detailed description of the structure of the subsalt stratum in the light of the new data. Among the findings were the following. The top of the subsalt bed is presumably represented by the exchange boundary BS (bottom of salt), hypsometrically situated above the Π_1 horizon, earlier identified with the bottom of the salt-bearing layer. The nonconformity of the BS horizon relative to the subsalt horizons, observed in individual sectors, is evidently evidence of erosion of the subsalt deposits in pre-Kungurian times. The top of the subsalt bed over the greater part of the internal depression of the syneclise is represented by terrigenous deposits. The subsalt stratum is broken down into three lithological-stratigraphic rock complexes: upper terrigenous, calcareous and lower terrigenous. In the regional internal structure of the subsalt complex it is possible to discriminate the Gur'yevskoye uplift, the Ryn-Peschanaya depression, the El'ton-Chelkarskiy and Sarpinskiy downwarps. The positioning of the top of the subsalt deposits in the central regions of the syneclise at depths accessible to drilling makes it possible to plan a search for deposits of petroleum and gas here. Figures 2; references 33 (Russian).
[33-5303]

ATTACK ON PLATE TECTONICS THEORY REFUTED

[Article by Yu. G. Gerasimov, "Significance of the Ideas of Plate Tectonics in Modern Geology"]

[Abstract] The author severely criticizes a recent article by I. I. Chebanenko entitled "Methodological Shortcomings of the 'New Global Tectonics'" (GEOL. ZHURN., Vol 38, No 5, pp 40-50, 1978). The bulk of this critique is devoted to refuting Chebanenko's purported misstatements and errors. After dismissing the facts and opinions expressed in the reviewed paper, the reviewer outlines what he feels the present situation really is. He points out that plate tectonics theory, with a minimum of assumptions, ties in all geological phenomena by cause-and-effect relationships into a sequential and continuous picture of the earth's geological development. During the 15 years of existence of the plate tectonics theory all the most important points in plate tectonics have been confirmed and there have been significant changes which make it possible to foresee a transition to a more general theory of global tectogenesis. There is no validity to Chebanenko's statement that the experience and knowledge accumulated through the efforts of many generations of geologists must be discarded. The suggestion by that author that lithologists, paleontologists and other specialists ignore plate tectonics can only result in their further lagging behind scientific progress. The reviewer feels that plate tectonics is the theoretical basis which has made possible a radical departure from old "fixist" concepts. References 18 (Russian).
[46-5303]

AUTOMATION OF SOLUTION OF GRAVITATIONAL POTENTIAL PROBLEMS

[Article by P. I. Balk, Siberian Power Institute, "Automation of Solution
of Problems in the Analytical Theory of Specific Models in Gravitational
Potential Problems"]

[Abstract] This article is devoted to a new scientific direction, geophys-
ical cybernetics, developed on the basis of computational and interpretive
geophysics (see V. N. Strakhov, "From Computational Geophysics to Geophys-
ical Cybernetics," IZV. VUZov, GEOLOGIYA I RAZVEDKA, No 5, 1977). It con-
tains a summarization of the first practical experience in the use of el-
ectronic computers for the purpose of automation of scientific investiga-
tions in the field of analytical problems in the mathematical theory of
interpretation of gravitational anomalies. The paper represents material
presented at a seminar "Problems in the Theory and Practice of Geological
Interpretation of Gravitational and Magnetic Anomalies," Moscow, November,
1977. Applicable to classes of specific models of field sources, the author
develops the idea and method for formulating programs for derivation of an-
alytical formulas for the direct problem and computer-oriented algorithms
for analysis of the structure of external gravitational fields. The means
for automation of solution of the uniqueness problem in the inverse poten-
tial problem and determination of densities not creating an external field
are discussed. The materials presented here are close to those considered
in the "artificial intellect" problem. Figures 1; references 19: 17 Russian,
2 Western.
[22-5303]

SOLUTION OF DIRECT THREE-DIMENSIONAL PROBLEM IN GRAVIMETRY

[Article by V. N. Strakhov, Institute of Physics of the Earth, "Method for
Approximate Solution of the Direct Three-Dimensional Problem in Gravimetry"]

[Abstract] In connection with the increase in capabilities of electronic com-
puters, and also development of the optimization and regularization concepts,
it is now extremely timely to formulate algorithms for solution of three-
dimensional inverse problems in gravimetry. Accordingly, the author here
proposes such a solution in a class of polynomial densities based on comput-
ation of integrals using cubature formulas having a sufficiently high alge-
braic degree of accuracy T. It is shown that the use of such cubatures is
equivalent to replacement of the volumetric distributions of masses by sets
of point masses whose harmonic moments coincide with the moments of the

volumetric masses to the order T - R; here R is the degree of the polynomial describing the law of density change. Although this approach to the formulation of algorithms for solution of direct three-dimensional problems in gravimetry is new in geophysics, it is classical for computational mathematics. Tables 3; references 8: 6 Russian, 2 Western.
[27-5303]

ANALYSIS OF FREQUENCY OF SEISMIC TREMORS AND ITS MAPPING

[Article by S. S. Seyduzova, L. M. Matasova, R. S. Mikhaylova, I. B. Yakovleva, K. D. Dzhanuzakov, I. B. Abramova and A. Mamatkulov, Institute of Geology and Geophysics, Uzbek Academy of Sciences, "Analysis of the Frequency of Seismic Tremors in the Example of Kirgizia and Uzbekistan"]

[Abstract] During the period of preparation (1971-1975) of materials for creating a new seismic regionalization map of the USSR, numerous calculations of the frequency of seismic tremors were carried out in Uzbekistan and Kirgizia. These computations were used in plotting a series of maps of the frequency of tremors in eastern Uzbekistan and the entire territory of Kirgizia. This involved use of different initial data representing primarily the distributions of earthquakes by energy K or magnitude M, maps of seismic activity A, maximum possible earthquakes K_{max} and the patterns of attenuation of intensity I of tremors with distance. The purpose of this paper is a description of the highly complex procedures employed in the processing and analysis of the pertinent data. The authors describe six variants used for Uzbekistan and four used for Kirgizia. The final isoline maps are also given. In addition, it is shown that one of the principal factors exerting an influence on the change in the periods of repetition of tremors of a particular intensity is the law of attenuation of intensity. Figures 6; references 16: 15 Russian, 1 Western.
[27-5303]

DETERMINING OPTIMUM DISTRIBUTION OF SEISMIC STATIONS

[Article by Ye. F. Savarenskiy, V. V. Sofronov, A. V. Peshkov, L. F. Verbova and I. V. Peshkova, Institute of Physics of the Earth, "Optimum Distribution of Seismic Stations by Minimizing Error in Epicenter Determination"]

[Abstract] A study was made of optimization of the distribution of seismic stations in such a way that the minimum error in determining epicenters would be obtained using data from the minimum number of stations. An optimization

algorithm for this purpose has been formulated and is described here in detail. The program is prepared in ALGOL-60 language. Application of the algorithm is illustrated in a particular example. In the illustrated case the selected five-seven stations ensured a maximum accuracy in the determination of epicenters and rigorous restrictions on siting of the stations were imposed on only three. Similar computations can be made for any earthquake region. Thus, the problem of choice of an observation network ensuring the minimum error in determining the coordinates of an epicenter by the minimum number of stations can be reduced to the classical optimization problem. A solution is found by the "search optimization" method.
[20-5303]

PHOTOELECTRIC INSTRUMENT FOR CHECKING LINEARITY

[Article by V. P. Soldatov, Moscow Institute of Geodetic, Aerial Mapping and Cartographic Engineers, "Photoelectric Instrument for Checking Linearity"]

[Abstract] A new phase-type instrument has been developed for the checking of the linearity of the surface profile of guides. As indicated by the diagrams accompanying the descriptive text, the instrument consists of a collimator with a diaphragm in the form of a rectangular or circular aperture mounted at one end of the guides to be checked and a photoelectric receiving system mounted at the other end of the guides with provision being made for its movement. The instrument is described in detail, as is its operating principle. Since the phase measurement method is employed, there is virtual elimination of the errors caused by the amplitude instability of instrument parameters (nonidentity of the photometric properties of the two optical channels, response of the radiation detectors, etc.) and the medium in which the radiation is propagated. A laser without an additional optical focusing attachment can be used as a radiation source. With a change in range the response changes little because the size of the mark image in this case remains virtually constant. Figures 3; references 3 (Russian).
[21-5303]

ANALYSIS OF OBSERVATIONS OF PS MANTLE WAVES

[Article by L. P. Vinnik, N. G. Mikhaylova and R. A. Avetisyan, Institute of Physics of the Earth, "Analysis of Observations of PS Mantle Waves"]

[Abstract] PS exchange waves forming on discontinuities with a depth of about 400 and 650 km during the propagation of longitudinal waves of distant earthquakes were first discriminated on records of the Norwegian Seismic Array. Now there has been similar processing of the records of SKD long-period seismographs at Obninsk Observatory. The Obninsk and NORSAR data characterize the very same geological structure, the ancient East European Platform. This paper describes the geophysical information extracted from observations of PS exchange waves. At Obninsk specialists processed the records of 14 earthquakes with epicentral distances from 59 to 80°. The processing procedure is summarized. It is shown here that an analysis of the dynamic characteristics of the record of exchange waves makes it possible to judge the fine structure of the transitions on which these waves are formed. The analysis, in combination with other seismic data, considerably refines the position of the principal discontinuities in the mantle and imposes important limitations on the possible velocities of the transverse waves. The dynamic characteristics of the record of these waves contain information on the fine structure of the corresponding transitions. The evaluations made relate to the immediate neighborhood of the seismic station and make it possible to judge the horizontal changes in the velocity structure of the mantle. Figures 4; references 9: 2 Russian, 7 Western.
[55-5303]

FIFTH ALL-UNION SEMINAR-SCHOOL ON ELECTROMAGNETIC SOUNDING

[Article by L. L. Van'yan and M. N. Yudin, "Fifth All-Union Seminar-School on Electromagnetic Sounding"]

[Abstract] The Fifth All-Union Seminar-School on Electromagnetic Sounding was held at Mukachevo during the period 18-27 September 1978. One hundred lectures and reports were presented. Papers were presented on the following subjects, with some of the communications being briefly summarized. Theory of Geoelectrics, Results of Deep Investigations, Geoelectrics of the Carpathian Region, Interpretation of Data from Magnetotelluric Investigations, Sea Magnetotelluric Investigations, Sounding by Artificial Field Methods, Physical and Mathematical Modeling of Magnetotelluric Fields, Processing of Magnetotelluric Variations and Results of Magnetotelluric Reconnaissance.

Thus, this review of the conference work to a certain extent summarizes the state of the art of electromagnetic sounding in the USSR. An example of the summarizations is the following for sounding by artificial induced fields. During recent years MHD generators have come into use in a number of regions in the USSR as sources of electromagnetic fields. The power of these sources is so great that they make it possible to study deep structure to tens of kilometers. Mathematical modeling of nonstationary fields in complex media is accomplished using finite-difference methods. Deep electromagnetic soundings with the use of a MHD generator were carried out in the Urals and on the Kola Peninsula. The field source used was a line with a length of 35-50 km, grounded on the ends, or an ungrounded circuit measuring 1,000 x 1,000 m, into which a current of about 38,000 A is passed. As a result of the investigations it was possible to ascertain the conductivity of the rocks in their depth. The inhomogeneity of the geoelectric cross section has been studied. These investigations are evidence of the good prospects for using powerful sources of electric energy in deep soundings. Great power moments in the earth can be attained not only by the use of MHD generators, but also using powerful high-voltage power sources and long low-impedance current-conducting lines. The problem is successfully solved by using powerful d-c current transformers, fed from the power system, and electric transmission lines, grounded at the final substations, as the current sources and the power leads. In this case with nominal votages of 9-46 KV it is possible to create currents greater than 1,000 A. The investigated depths are dependent on the geoelectric cross section and attain tens of kilometers.
[20-5303]

IV. ARCTIC AND ANTARCTIC RESEARCH

News

BRIEFS

SUPPLY FLIGHTS RESUMED -- Supply flights to the Arctic drifting stations "Severnyy Polyus-22" and "Severnyy Polyus-24" were resumed on 14 October 1979. Air communications between the mainland and the drifting stations were restored after an interruption of nearly five months.
[Summary] [Moscow PRAVDA in Russian 15 Oct 79 p 6]

HYDROGRAPHIC SHIPS IN ARCTIC -- The research vessel "Georgiy Maksimov" has set out from the Provideniya Hydrographic Station in Provideniya Bay for high Arctic latitudes. On board the ship are a number of those involved in the Fourth Comprehensive Arctic Hydrographic Expedition of the hydrographic enterprise of the Merchant Fleet which will conduct research in the Chukchi Sea. Two other ships, the "Fedor Matisen" and the "Eduard Tol'," are already now operating in the Arctic. Hydrographers are gathering materials in order to compile navigational maps which will include as yet uncharted Arctic seas.
[Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Oct 79 p 4]
[30]

5303   -END-
CSO: 1865

END OF

FICHE

DATE FILMED

15 Jan 1980

DD.